Math 3210-3
HW 25

Due Friday, November 30, 2007

Convergence Tests

1. Determine the values of p for which the series $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\log n)^p}$ converges.

2. Determine whether each series converges conditionally, converges absolutely, or diverges. Justify your answers.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\log n}$

   (b) $\displaystyle\sum \frac{(-2)^n}{n^2}$

   (c) $\displaystyle\sum \frac{(-3)^n}{n!}$

   (d) $\displaystyle\sum \left(\frac{1}{\sqrt{n}} - \frac{1}{n}\right)$

3. Find an example to show that the convergence of $\sum a_n$ and the convergence of $\sum b_n$ do not necessarily imply the convergence of $\sum(a_n b_n)$.

4. Show that the series
$$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{2^2} + \frac{1}{5} - \frac{1}{2^3} + \frac{1}{7} - \frac{1}{2^4} + \cdots$$
diverges. Why doesn't this contradict the alternating series test?